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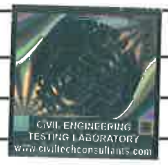
BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/AIV/2014-15 12.07.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	12.07.2014



Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	302	
4	Aggregate Impact value = percent fines	20.94	21.15	
	100* (W_2/W_1)%			**21.05**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Note:

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Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/S-T/2014-15 12.07.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of Work	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.07.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.35%**

Elongation Index = **13.10%**

Result : Combined Flakiness & Elongation index 25.45%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.07.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.55%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index 24.80%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.07.2014

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Result : Flakiness Index = **12.52%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index 25.77%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.07.2014

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Result : Flakiness Index = **12.85%**

Elongation Index = **13.65%**

Result : Combined Flakiness & Elongation index 26.50%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
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Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.07.2014

Result : Flakiness Index = **12.56%**

Elongation Index = **13.05%**

Result : Combined Flakiness & Elongation index 25.61%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

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Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	12.07.2014

Result : Flakiness Index = **11.85%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index 25.11%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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QUALITY CONTROL REPORTS FOR

SEMI DENSE BITUMINOUS CONRETE

Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC(QB)/2014-15 06.08.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	:	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
SOURCE OF LOCATION	:	Hot mix Plant, Bangalore
DATE OF TESTING	:	06.08.2014

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The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	84	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	296	Min. 220

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/AIV/2014-15 06.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	06.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	390	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	89	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.62	22.82	22.72

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 2[illegible]%

Note:

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/AIV/2014-15 06.08.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	06.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.58	20.68	20.63

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
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Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	06.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	385	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	83	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.61	21.30	**21.46**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Aggregate Impact Value

IS: 2386 Part IV

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Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	06.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	386	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.02	22.22	22.12

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	06.08.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	88	82	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	307	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.68	21.08	21.88

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 24%

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DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

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Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 06.08.2014

Result : Flakiness Index = **11.06%**

Elongation Index = **13.25%**

Result : Combined Flakiness & Elongation index **24.31%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Date of Testing	: 06.08.2014

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Result : Flakiness Index = **12.35%**

Elongation Index = **13.15%**

Result : Combined Flakiness & Elongation index **25.50%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 06.08.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.35%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index **25.61%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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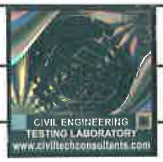
Reference	: AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 06.08.2014



Result : Flakiness Index = **11.56%**

Elongation Index = **13.06%**

Result : Combined Flakiness & Elongation index **24.62%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

Note:

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Shape_T/2014-15 : 06.08.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	: AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 06.08.2014

Result : Flakiness Index = **12.90%**

Elongation Index = **13.10%**

Result : Combined Flakiness & Elongation index **26.00%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Stripping/2014-15 08.08.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	08.08.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Sp_Wa/2014-15 08.08.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
Reference	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	08.08.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2026	2025	2024	
2	Weight of basket suspended in water	W_2 g	755	2020	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1271	1270	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2020	2021	2022	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	749	751	753	
6	Weight of oven dried aggregate	W_4 g	1999	2012	2010	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.669	2.679	2.669	2.672
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.746	2.712	2.713	2.723
9	Water Absorption	$((W_3-W_4)*100)/W_4$	1.05%	0.45%	0.60%	0.70%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Bit/2014-15 08.08.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC:SP:-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
SAMPLE I/D	Cross Roads in UAS Layout Jakkur in Ward No.07,
DATE OF TESTING	08.08.2014

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BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

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BITUMEN CONTENT GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

CLIENT	**Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements of roads and drains in UAS Layout temple and cross roads in Jakkur Ward No.07 of Byatarayanapura, Kodigehalli Sub Division, BBMP, Bangalore.
REFERENCE	AEE/(K.O.D.SUB.DIV)/26/2014-15 Dated: 08.07.2014
SAMPLE I/D	Cross Roads in UAS Layout Jakkur in Ward No.07,
DATE OF TESTING	08.08.2014

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	26.32	5.54	5.54	94.46	90-100
4.75	256.3	53.96	59.50	40.50	35-51
2.36	59.32	12.49	71.99	28.01	24-39
1.18	41.23	8.68	80.67	19.33	15-30
0.3	33.32	7.01	87.68	12.32	9-19
0.075	32.23	6.79	94.47	5.53	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	25.36	5.35	5.35	94.65	90-100
4.75	260.5	54.96	60.31	39.69	35-51
2.36	58.36	12.31	72.62	27.38	24-39
1.18	35.26	7.44	80.06	19.94	15-30
0.3	30.26	6.38	86.44	13.56	9-19
0.075	35.65	7.52	93.96	6.04	3-8

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